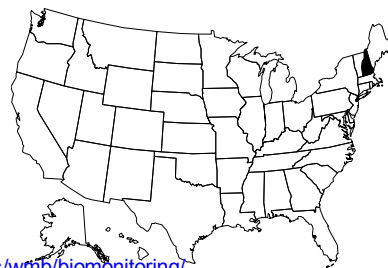# NEW HAMPSHIRE

Contact Information

David Neils, Biomonitoring Program Coordinator
New Hampshire Department of Environmental Services (NHDES)
6 Hazen Drive ■ Concord, NH 03302-0095
Phone 603/271-8865 ■ Fax 603/271-7894
email: dneils@des.state.nh.us
NHDES Watershed Management Bureau, *Biomonitoring Program*: http://www.des.state.nh.us/wmb/biomonitoring/

Program Description

The New Hampshire Department of Environmental Services (NHDES) has been gathering biological data in wadeable streams and rivers since 1995. The primary goal of this effort is the development of numeric biological criteria in support of the current narrative standard. Biological communities assessed for this purpose are fish and macroinvertebrates. Since the program's inception, the protocols for collecting data have remained fairly consistent. The fish are collected with a backpack electro-shocker for 150 meters, with efforts to include all habitats typical of the stream type. Macroinvertebrate sampling is done by rock baskets deployed for 8 weeks and retrieved in the fall. A visual habitat assessment is also conducted at each station using USEPA's Rapid Bioassessment Protocols for high or low gradient streams, whichever is appropriate.

Since the program's beginnings, over 200 stations have been assessed. These stations are captured in an ArcView coverage that includes watershed delineations specific to the biological sampling station. Efforts are currently underway to determine the degree of human activity in each of the watersheds by evaluating parameters such as land use, population, hazardous waste sites and road density. This type of scoring will help to determine reference quality/least impacted sites.

The Biomonitoring Program is also investigating the need to classify the wadeable streams in New Hampshire. The state is small but very diverse, with low coastal systems and high mountainous regions. It is not yet clear whether it will be necessary to establish unique biological criteria for different regions of the state.

In the past, biomonitoring information has been used for 305(b) reporting and also for 303(d) listing. The Watershed Management Bureau, which is responsible for producing these reports, is currently evaluating the assessment and listing methodologies, using USEPA's CALM guidance. In 2002-2003 the Biomonitoring Program will be testing a probabilistic sampling design for site selection. This type of sampling will allow for greater confidence in statements of statewide water quality, and continue to provide useful data for biocriteria development.

Information about New Hampshire's Biomonitoring Program, including sampling protocols, can be found at http://www.des.state.nh.us/wmb/biomonitoring/.

Documentation and Further Information

State of New Hampshire 2000 Section 305(b) Water Quality Report:
http://www.des.state.nh.us/wmb/2000-305b.pdf

NHDES Biomonitoring Program Protocols, January 2002:
http://www.des.state.nh.us/wmb/biomonitoring/protocols.pdf

New Hampshire Biomonitoring Program general information:
http://www.des.state.nh.us/wmb/biomonitoring/sites

NEW HAMPSHIRE

Contact Information

David Neils, Biomonitoring Program Coordinator
New Hampshire Department of Environmental Services (NHDES)
6 Hazen Drive ■ Concord, NH 03302-0095
Phone 603/271-8865 ■ Fax 603/271-7894
email: dneils@des.state.nh.us

Programmatic Elements

Use of bioassessment within overall water quality program		
	✓	problem identification (screening)
	✓	nonpoint source assessments
	✓	monitoring the effectiveness of BMPs
	✓	ALU determinations/ambient monitoring
	✓	promulgated into state water quality standards as biocriteria
		support of antidegradation
	✓	evaluation of discharge permit conditions
		TMDL assessment and monitoring
	✓	other: Ecological Risk Assessments

Applicable monitoring designs		
	✓	targeted (i.e., sites selected for specific purpose) *(special projects and specific river basins or watersheds)*
	✓	fixed station (i.e., water quality monitoring stations) *(special projects only)*
		probabilistic by stream order/catchment area
		probabilistic by ecoregion, or statewide
		rotating basin
		other:

Stream Miles

Total miles *(State based determination)*	**10,881**
Total perennial miles	8,636
Total miles assessed for biology	**400**
fully supporting for 305(b)	389
partially/non-supporting for 305(b)	11
listed for 303(d)	0
number of sites sampled *(on an annual basis)*	130
number of miles assessed per site*	~3

400 Miles Assessed for Biology

389 miles

11 miles

◖ "fully supporting" for 305(b)
☐ "partially/non-supporting" for 305(b)
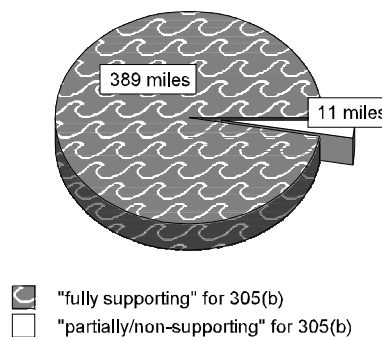
*NHDES will be doing random sampling in the future. For now, 150 meters are assessed and extrapolated to a broader area, roughly three miles per site, though this number does vary.

Aquatic Life Use (ALU) Designations and Decision-Making

ALU designation basis	Class system (A, B, C)
ALU designations in state water quality standards	One designation: Fishable
Narrative Biocriteria in WQS	There aren't any written formal/informal numeric procedures to support narrative biocriteria decisions yet because they are very subjective. Presently, data is being analyzed using New York's metrics.
Numeric Biocriteria in WQS	under development
Uses of bioassessment data in integrated assessments with other environmental data (e.g., toxicity testing and chemical specific criteria)	✓ assessment of aquatic resources ☐ cause and effect determinations ✓ permitted discharges ☐ monitoring (e.g., improvements after mitigation) ☐ watershed based management
Uses of bioassessment/ biocriteria in making management decisions regarding restoration of aquatic resources to a designated ALU	none

Reference Site/Condition Development

Number of reference sites	40 total
Reference site determinations	✓ site-specific ☐ paired watersheds ☐ regional (aggregate of sites) ✓ professional judgment ☐ other:
Reference site criteria	Generally use best professional judgment. Least disturbed sites are determined following some stratification of characteristics (ArcView coverage, hazardous waste sites, etc.) – it is very visual.
Characterization of reference sites within a regional context *Not applicable**	☐ historical conditions ☐ least disturbed sites ☐ gradient response ☐ professional judgment ☐ other:
Stream stratification within regional reference conditions *Not applicable**	☐ ecoregions (or some aggregate) ☐ elevation ☐ stream type ☐ multivariate grouping ☐ jurisdictional (i.e., statewide) ☐ other:
Additional information	☐ reference sites linked to ALU ☐ reference sites/condition referenced in water quality standards ✓ some reference sites represent acceptable human-induced conditions

*Regional reference sites not used.

Field and Lab Methods

Assemblages assessed	✓	benthos *(<100 samples/year; single season, multiple sites - broad coverage)*
	✓	fish *(<100 samples/year; single season, multiple sites - broad coverage)*
		periphyton
	✓	other: amphibians/reptiles *(<100 samples/year; single season, multiple sites - broad coverage)*

Benthos	
sampling gear	D-frame, kick net (1 meter), multiplate, rock baskets; 500-600 micron mesh
habitat selection	multihabitat, artificial substrate
subsample size	100 count
taxonomy	genus, lowest reasonable taxa

Fish	
sampling gear	backpack electrofisher
habitat selection	multihabitat
sample processing	anomalies
subsample	none
taxonomy	species

Habitat assessments	visual based; performed with bioassessments
Quality assurance program elements	standard operating procedures; quality assurance plan; periodic meetings, training for biologists; sorting and taxonomic proficiency checks; specimen archival; certification program for bioassessment (Biologists must have a certificate of completion of USFWS Electrofishing Course)

Data Analysis and Interpretation

Data analysis tools and methods	✓	summary tables, illustrative graphs
		parametric ANOVAs
		multivariate analysis
	✓	biological metrics *(return single metrics - use endpoint for each single metric)*
		disturbance gradients
		other:

Multimetric thresholds	
transforming metrics into unitless scores	under development - Presently, only the raw score is tracked – there is no scale of comparison with the reference site yet.

Evaluation of performance characteristics		repeat sampling
		precision
Information not provided		sensitivity
		bias
		accuracy

Biological data	
Storage	EDAS
Retrieval and analysis	EDAS